

## Cicindela willistoni funaroi (Funaro's Tiger Beetle)

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### Taxonomy

- **Class:** INSECTA
- **Order:** COLEOPTERA
- **Family:** CARABIDAE
- **Genus:** Cicindela
- **Scientific Name:** Cicindela willistoni funaroi Rotger, 1972
- **Common Name:** Funaro's Tiger Beetle
- **Synonyms:**
- **Taxonomic Name Source:** C. Barry Knisley, Mark S. Romero, Robert E. Acciavatti. 2023. Tiger Beetles of New Mexico: Identification, Biology, and Conservation.

### Agency Status

- **NMDGF:**
- **Federal Status:**
- **BLM Sensitive:**
- **USFS:**
- **IUCN Red List:** [Not Evaluated](#)
- **Nature Serve Global:** [T2](#)
- **NHNM State:** S1
- **NM Endemic:** YES

### Description

From Tiger Beetles of New Mexico: (C. Barry Knisley, Mark S. Romero, Robert E. Acciavatti. 2023. Tiger Beetles of New Mexico: Identification, Biology, and Conservation.) " *Cicindela willistoni funaroi* is generally considered different from other subspecies by its smaller size, reddish dorsal coloration, and wider maculation."

### Habitat and Ecology

This tiger beetle is a narrow specialist only known from saline semi-fluvial habitats with significant amounts of water and open areas (Knisley et al. 2023) Currently they are known along the wide low floodplain of the Rio Salado (Knisley et al. 2023). The tiger beetle is active in spring and fall and with records in April and May and then again in September and October generally it stays dormant during the dry months of September and October (Knisley et al. 2023).

## Geographic Range:

Funaro's Tiger Beetle is endemic to New Mexico and has the smallest known distribution of any tiger beetle in New Mexico (Knisley et al. 2023). Historically the subspecies was known from five sites however, recent surveying has indicated that only one site is currently extant that being one site along the Rio Salado in San Ysidro located in Sandoval County (Knisley et al. 2023). While this river extends north and south, surveys found no beetles present and a more limited and unsuitable floodplain habitat. This area is privately owned and frequently used for grazing (Knisley et al. 2023)

## Conservation Considerations:

Knisley et al. (2023) recommend that Funaro's Tiger Beetle be considered for endangered species status as the area of potential habitat is so limited and subject to significant impacts a designation would allow for appropriate protections at the local and state level while also informing essential conservation measures. Further taxonomic research is also necessary as historically there has been a lot of debate on the placement of this subspecies. For Funaro's Tiger Beetle long term management and monitoring of its population size and distribution is one of, if not the most critical activity to better assess its status and recovery options (Knisley and Gwiazdowski 2020). Biological studies are also needed to further determine population dynamics, threats, and key conservation strategies especially as they inform captive rearing, and translocation (Knisley and Gwiazdowski 2020). A site management or habitat management plan to properly protect and preserve these rare and important saline wetlands is also likely needed. Acquisition of currently occupied sites and protection of the habitats within them are the most important strategies for combating habitat loss and deterioration which is one of the major threats to this tiger beetle (Knisley and Gwiazdowski 2020). Required of these sites would be active, annual, or semiannual management to ensure the coequal goal of maintaining sufficient habitat quality (Knisley and Gwiazdowski 2020). Among the most significant and accomplishable of these management methods for habitat would be reducing vegetation to create necessary open space for Tiger Beetle foraging and feeding (Knisley and Gwiazdowski 2020, Knisley et al. 2023). Many known historic sites for threatened tiger beetles have been lost or permanently impacted by development or other anthropogenic impacts; thus, captive rearing and translocation have demonstrated to be proven methods which can efficiently create populations for extirpated sites (Knisley and Gwiazdowski 2020). A lack of unoccupied sites with suitable habitat can be a significant limitation with this approach as supplementing existing populations in decline without concurrent habitat improvement yields a reduced likelihood of success (Knisley and Gwiazdowski 2020).

## Threats:

Adults of this subspecies are no longer present at type locality because of vegetation encroachment and land use changes including agricultural activity which have eliminated formerly open areas of bare ground (Knisley et al. 2023). Bare ground is essential to the species survival and the tiger beetle does not persist without it. These can come from various land use changes but also from Furthermore, the lowering of water flows from irrigation, diversions, dams, development, and other disruptions on water-edge habitats reduce periodic sand deposition needed to sustain and create suitable substrates, resulting in increased vegetation growth that eliminates the open areas needed by tiger beetles (Knisley et al. 2023). Lower floodplain damage due to trampling by cattle has also been observed (Knisley et al. 2023). These threats to water-edge habitats are pervasive and damaging enough to substantially affect even generalist species (Knisley et al. 2023). Water reliant species in the southwest are of particular threat as drier conditions driven by climate change increase the rate and length of droughts as well as facilitate reductions in soil moisture (Knisley et al. 2023). The Southwestern U.S. saw its driest 22-year period from 2000 to 2021 since at least 800 CE (Williams et al. 2022) and droughts are projected to become more prolonged, severe, and common in the region under future climate change scenarios (USGCRP 2018). Lower groundwater levels mean that even these saline habitats experience considerably decreased periods of time when they hold water (Knisley et al. 2023). Lack of water reduces adult activity time and can adversely affect food availability, oviposition, survival, and larval recruitment, all of these ultimately

resulting in smaller populations with increased larval mortality, prolonged larval development, as well as reduced adult fecundity (Knisely et al. 2023). The catastrophic decline of the Coral Pink Sand Dunes Tiger Beetle (*Cicindela albissima*) in southwestern Utah is an important recent example for understanding the effects of drought on southwestern tiger beetles (Knisely et al. 2023). Adult members had increased in recent years to a peak around 3,000 in 2018 and 2019, then declined to less than 200 in 2021 after record low rainfall in summer of 2019 through the fall of 2020 (Knisely et al. 2023). Though more research is needed on the specific impacts on this subspecies, cattle grazing has also proved to be a substantial detriment to the reopening of larval burrows for other tiger beetle species such that even burrows that are food supplemented may not open after only a second disturbance by cattle (Bauer 1991).

## Population:

The population of Funaro's Tiger Beetle seems to have declined over time as it was once known from five sites and is now only known from a singular site (Knisley et al. 2023). Past studies with southwestern tiger beetles have found that their population trends are largely determined by rainfall (Knisley et al. 2023). This is concerning as the Southwestern U.S. saw its driest 22-year period from 2000 to 2021 since at least 800 CE (the time period used in previous climatic reconstructions) (Williams et al. 2022) and droughts are projected to become more prolonged, severe, and common in the region under future climate change scenarios (USGCRP 2018). This may be resulting in population declines however, more information is needed on the subject.

## References:

- U.S. Global Change Research Program (USGCRP). 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II.
- C Barry Knisley and Rodger Gwiazdowski. 2020. Conservation Strategies for Protecting Tiger Beetles and Their Habitats in the United States: Studies With Listed Species (Coleoptera: Carabidae: Cicindelidae). *Annals of the Entomological Society of America* 114: (293-301).
- Bauer L. Karen. 1991. Observations on the Developmental Biology of *Cicindela Arenicola* Rumpff (Coleoptera: Cicindelidae). *The Great Basin Naturalist* 51: (226-235).
- Williams, A.P., Cook, B.I. and Smerdon, J.E.. 2022. Rapid intensification of the emerging southwestern North American megadrought in 2020–2021. *Nature Climate Change* 12: (232-234).
- C. Barry Knisley, Mark S. Romero, Robert E. Acciavatti. 2023. *Tiger Beetles of New Mexico: Identification, Biology, and Conservation*. Conquest Graphics.

## More Information

